REMARKS

The application has been carefully reviewed in light of the Office Action dated August 3, 2001. Claims 161-163 have been cancelled. Claims 142, 145, 150, 155 and 158-160 have been amended. Applicants reserve the right to pursue the original claims and other claims in this or other applications. Claims 142-160 are still pending in this case.

Attached hereto is a marked-up version of the changes made to the claims by the current Amendment, entitled "Version With Markings to Show Changes Made."

Claim 158 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Takeuchi (U.S. Patent 5,017,513). Applicants respectfully traverse the rejection and request reconsideration.

Amended claim 158 defines a conditioning solution which consists essentially of "a flourine source, a complementary acid, a non-aqueous solvent and a surface passivation agent, wherein [the] conditioning solution is substantially non-aqueous. None of the cited references teach or suggest the inventive combination defined by amended claim 158.

For example, Takeuchi does not teach or suggest the use of a surface passivation agent in the solution. In addition, Takeuchi does not teach or suggest that the conditioning solution be substantially non-aqueous. A non-aqueous solution helps to ensure that the amount of material removed from exposed surfaces of the semiconductor substrate is minimized. Furthermore, Takeuchi does not teach or suggest that its solution be used to remove residue remaining after a dry etch process.

Claims 142-157 and 160-163 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schellenberger et al. (U.S. Patent 5,714,203) in view of Ward et al. (U.S. Patent 5,988,186). Applicants respectfully traverse the rejection and request reconsideration.

Claims 161-163 have been cancelled; and, therefore, the rejection is moot as to those claims. Amended claims 142 and 150 each recite that a conditioning solution comprises "hydrofluoric acid, phosphoric acid [claim 150 recites "hydrochloric acid" instead of phosphoric acid], propylene glycol and citric acid acting as a surface passivation agent, wherein [the] conditioning solution is substantially non-aqueous." None of the cited references teach or suggest the respective inventive combinations defined by claims 142 and 150.

For example, neither Schellenberger nor Ward provides any incentive or suggestion that their respective teachings be combined to arrive at a substantially non-aqueous conditioning solution comprising the respective combinations defined by claims 142 and 150. Rather, Schellenberger is directed toward a procedure for the drying of silicon (as the title indicates) and in several places describes the use of an aqueous hydrofluoric acid solution. (See, e.g., Schellenberger at column 3, line 16, line 29, line 55.)

In addition, Schellenberger makes no mention of performing a dry etch process or of removing dry etch residues. Furthermore, Schellenberger does not teach or suggest a substantially non-aqueous conditioning solution comprising a fluorine source, a complementary acid, a non-aqueous solvent and a surface passivation agent so as to minimize the amount of material removed from exposed surfaces of a semiconductor substrate. By using a substantially non-aqueous conditioning solution, the present invention minimizes the amount of material removed from exposed surfaces and also reduces corrosion of exposed metal surfaces as compared with conventional aqueous conditioning solutions.

Similarly, Ward does not teach or suggest the respective inventive combinations defined by claims 142 and 150. For example, Ward does not teach or suggest that its stripping and cleaning composition be employed after a dry etch process in order to remove

residues remaining thereafter. In addition, Ward does not mention the use of a passivation agent combined with such a non-aqueous conditioning solution. Furthermore, although Ward mentions polyhydric alcohol in concentrations of about 65%-85% by weight, it discloses a maximum of 77.5% by weight (and in most instances, significantly lower concentrations) of such alcohols in four separate examples describing the invention (Ward at column 4, lines 55-64; column 5, lines 5-12, lines 20-27, lines 39-45; column 6, lines 11-25). Moreover, Ward characterizes its stripping and cleaning composition as an "aqueous" one (Ward at claim 1).

Claims 143-149 and 151-160 depend either directly or indirectly from claims 142 and 150 and are allowable for at least those reasons described above and also because none of the cited references teach or suggest their respective inventive combinations.

Claim 159 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Takeuchi in view of Ward. Applicants respectfully traverse the rejection and request reconsideration.

Claim 159 depends from claim 158 and is allowable for at least those reasons described above and also because none of the cited references teach or suggest its inventive combination of hydrofluoric acid, phosphoric acid, propylene glycol and citric acid as a passivation agent.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejections of the claims and to pass this application to issue.

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Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

142. (Amended) A conditioning solution for use in removing residues remaining on a semiconductor substrate after a dry etch process, said conditioning solution comprising:

hydrofluoric acid;

phosphoric acid;

propylene glycol; and

citric acid acting as a surface passivation agent, wherein

said conditioning solution is substantially non-aqueous.

145. (Amended) The solution of claim 144, wherein said solution comprises approximately 0.01 to approximately 5.0 percent hydrofluoric acid, approximately 1 to approximately 15 percent phosphoric acid, approximately 80 to approximately [95] 90 percent propylene glycol, and approximately 0.001 to approximately 1.0 percent citric acid.

150. (Amended) A conditioning solution for use in removing residues remaining on a semiconductor substrate after a dry etch process, said conditioning solution comprising:

hydrofluoric acid;

hydrochloric acid;

propylene glycol; and

citric acid acting as a surface passivation agent, wherein

said conditioning solution is substantially non-aqueous.

155. (Amended) The solution of claim 154, wherein said solution comprises approximately 0.25 to approximately 0.3 percent hydrofluoric acid, approximately [6] 0.005 to approximately |7| 0.009 percent hydrochloric acid, approximately 90 to approximately 98 percent propylene glycol, and approximately 0.009 to approximately 0.5 percent citric acid.

158. (Amended) A conditioning solution for use in removing residues remaining on a semiconductor substrate after a dry etch process consisting essentially of a fluorine source, a complementary acid, |and| a non-aqueous solvent and a surface passivation agent, wherein

said conditioning solution is substantially non-aqueous.

159. (Amended) The solution of claim 158, wherein the fluorine source is hydrofluoric acid, the complementary acid is phosphoric acid, [and] the non-aqueous solvent is propylene glycol and the surface passivation agent is citric acid.

160. (Amended) The solution of claim 158, wherein the fluorine source is hydrofluoric acid, the complementary acid is hydrochloric acid, |and| the non-aqueous solvent is propylene glycol and the surface passivation agent is citric acid.